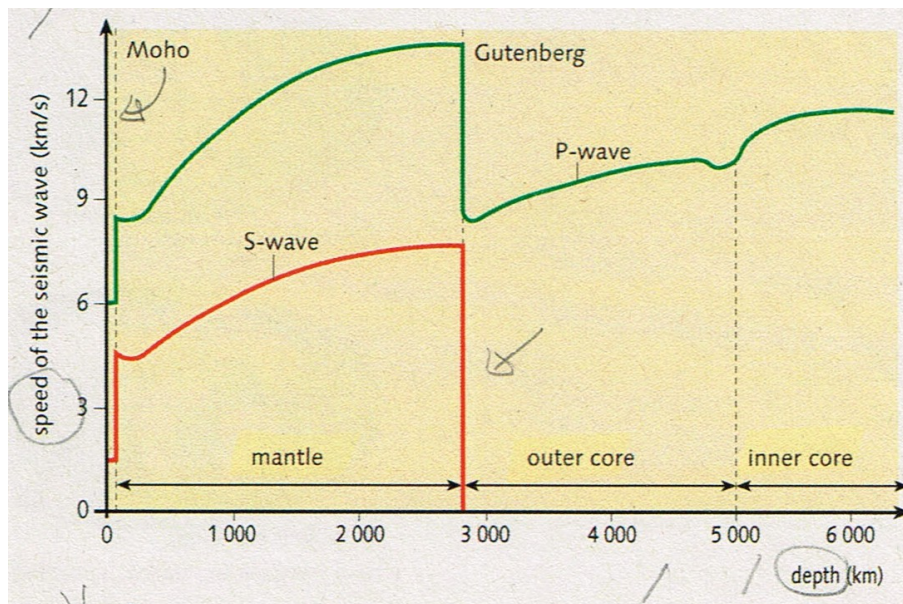
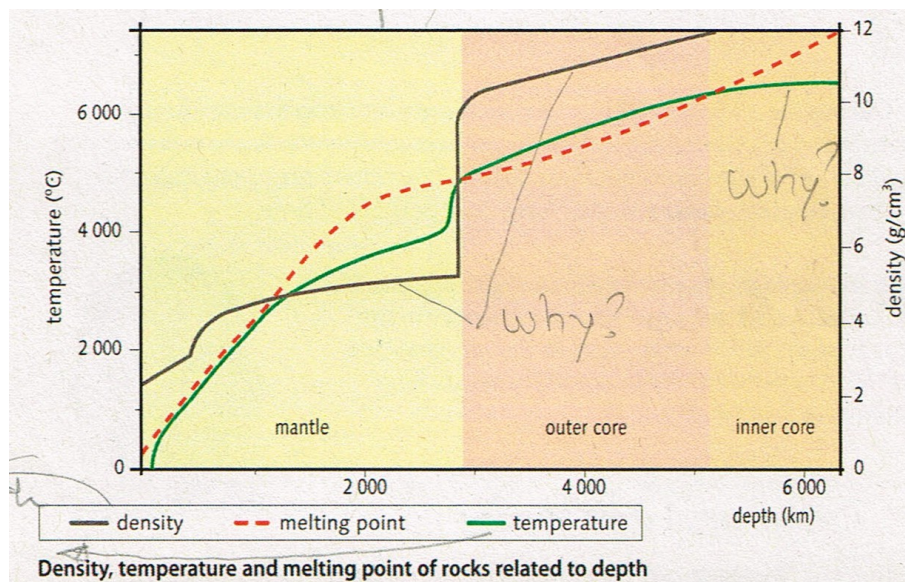


Once we have a slight idea about how seismic waves provide data from the inner Earth, **we assume that geologists can plot this graph**



- Which properties does it represent?
 - How fast are P-waves and S-waves?
 - Sharp changes in the speed of waves are called major discontinuities (discontinuidades de primer orden-. Put them in place. They are due to ...
 - Also you can see soft changes in the speed of waves. Put them in place and explain the one at 5000 Km deep.
 - The soft change in speed at depths between 100 and 200 km below the surface is called "low-viscosity asthenospheric channel". The decrease in speed here is due to...
- As a consequence we can define asthenosphere and lithosphere as...

Also we assume that geologists can plot **this other graph**



- What do data show?
- Describe density inside the Earth. Why does the Earth have layers of increasing density from its crust to its core. Why is Earth's density like that? This is the consequence of the the way the Earth was formed. [Video1](#) and [video 2](#)
- Describe temperature inside the Earth. Why is Earth's temperature like that? You could find the answers in the previous videos
- By looking at the melting point line, can you find the outer core?

a.- Which properties does it represent?

The graph shows how change in seismic wave speed depending on depth.

b.- How fast are P-waves and S-waves?

Speed of seismic waves (P-wave speed ranging from 6Km/s to 14Km/s; S-wave speed ranging from 1'5 Km/s to 7 Km/s)

c.- Sharp changes in the speed of waves are called major discontinuities (discontinuidades de primer orden-. Put them in place. They are due to ...

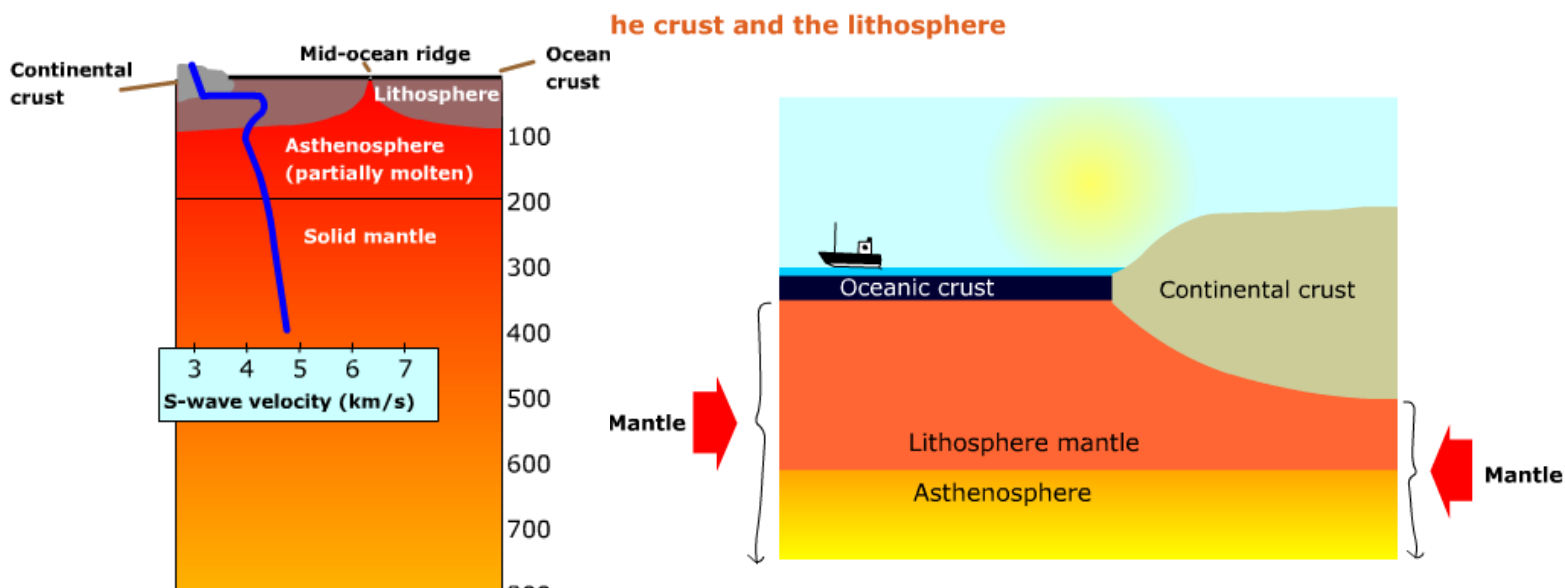
Mohorovicic discontinuity is shown as a sharp increase in seismic waves speed around 30-40 km below continents and 10 km below the seefloor. Moho represents the boundary between the crust and the mantle.

Gutenberg discontinuity is shown as a sharp decrease in seismic waves speed around 2900 km deapth. Gutenberg discontinuity represents the boundary between the mantle and the liquid outer core -S-waves can not travel through liquid materials AND P-waves travel slower than through solids.

d.- Also you can see soft changes in the speed of waves. Put them in place and explain the one at 5000 Km deep.

A minor discontinuity locates between the outer and the inner core where there is a slight increase in P-wave speed. (Slightly above it, you can see the hotter outer core named as D-layer)

e.- The soft change in speed at depths between 100 and 200 km below the surface is called "low-viscosity asthenospheric channel". The decrease in speed here is due to... mantle material partially molten (1-2%%: you can think of it as a solid sponge whose holes contain magma)



The Asthenosphere is a level inside the mantle where balance between temperature and pressure makes SOME (1-2%) compounds to be molten. **The composition of the Asthenosphere is the same as the the composition of rest of the mantle; its state has to do with the balance temperature/presure.**

IMPORTANT IDEA. Above the Asthenosphere, temperature is not high enough to melt rocks and the mantle is solid; below the Asthenosphere, pressure becomes higher and the rest of the mantle is solid despite the increasing temperature.

As a consequence we can define Lithosphere as a solid layer above the Asthenosphere. Lithosphere contains crust and the upper part of the mantle above the Asthenosphere

f.- What do data show?

How density, temperature and melting point change in depth.

g.- **Describe density inside the Earth. Why does the Earth have layers of increasing density from its crust to its core? Why is Earth's density like that? This is the consequence of the way the Earth was formed. [Video1](#) and [video 2](#)**

The prevailing theory on how planets are formed is that they are formed through **ACCRETION**¹ (a process of sticky collision). Dust particles in the nebula steadily accumulate mass to form ever-larger bodies. Local concentrations of mass known as planetesimals form, and these accelerate the accretion process by drawing in additional material by their gravitational attraction.

The energetic impacts (as well as radioactive decay) will **HEAT UP** the growing planet, causing it to at least partially melt. The interior of the planet begins to **DIFFERENTIATE**, developing a denser core and putting the rest of materials into order according to their density (the gases outside)

Smaller terrestrial planets lose most of their atmospheres after differentiation -such as Mercury or asteroids)

h.- **Describe temperature inside the Earth. Why is Earth's temperature like that? You could find the answers in the previous videos.**

We have already explained where Earth interior heat comes from: interior heat is a remnant from collisions when the Earth accretion occurred; and interior heat comes from the radioactive decay of some elements in rocks

i.- **By looking at the melting point line, can you find the outer core?**

Between 2900 km deep and 5200 km deep inside the Earth, temperature is higher than the materials melting point so they are molten.

1 /ə'kri:ʃn/